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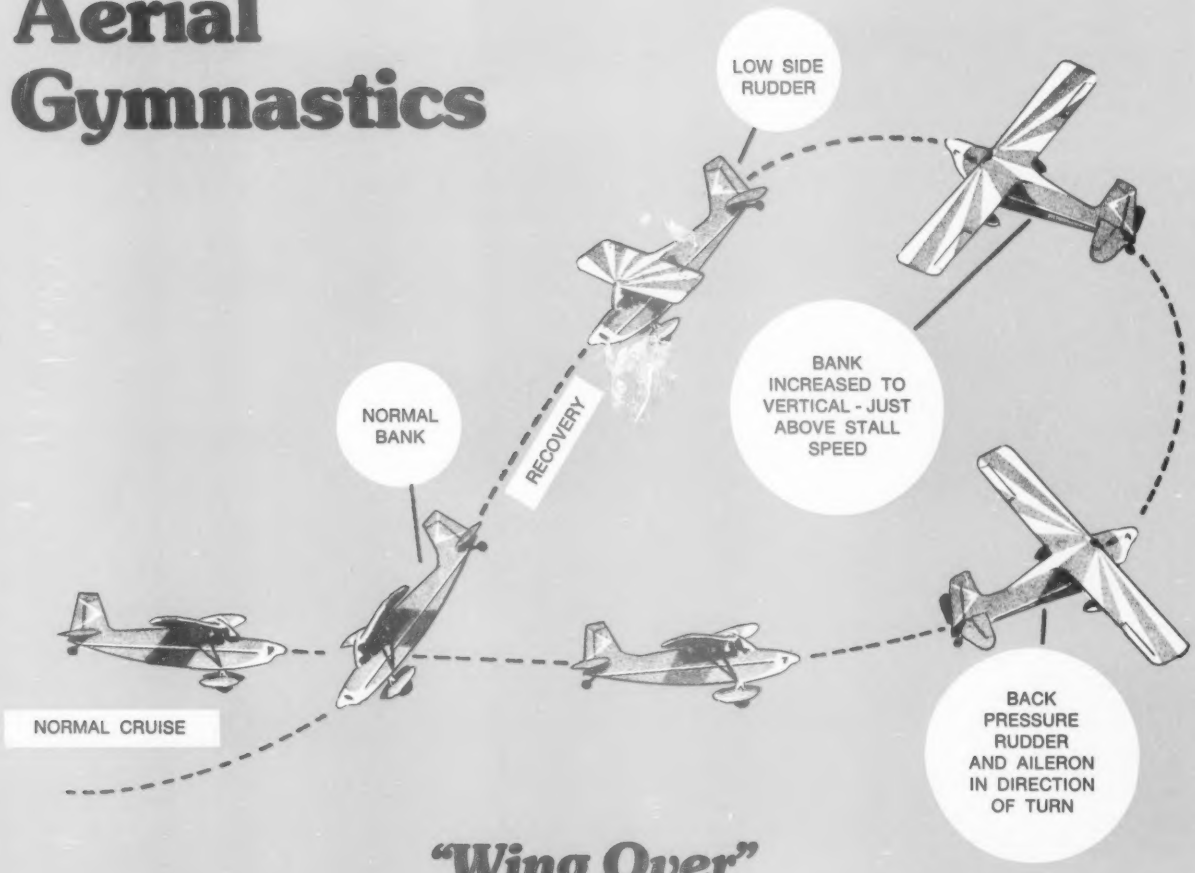
Aerial Gymnastics


LOW SIDE RUDDER
BANK INCREASED TO VERTICAL - JUST ABOVE STALL SPEED
NORMAL BANK
RECOVERY
NORMAL CRUISE
BACK PRESSURE RUDDER AND AILERON IN DIRECTION OF TURN

"Wing Over"

FAA GENERAL AVIATION NEWS

**DEPARTMENT OF TRANSPORTATION/
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October 1978

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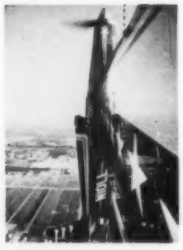

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Precision Performance

Aerobatics with a purpose

Aerial acrobatics, or "aerobatics" in the popular term, has been a part of flying since the first decade of aviation. No sooner did man learn how to build a machine he could control in flight than he began to master a repertory of eye-popping and breath-taking maneuvers that soon became the highpoint of outdoor shows and fairs all over the world. This was particularly true in the days before the airplane was accepted as a form of commerce and transportation. In those early days the words "daredevil" and "aviator" were practically synonymous. Changing this image was one of the problems in building public acceptance of the air carrier and the community airport; even today aerobatic flying is commonly thought of as stunt flying and dangerous stuff.

But within the last 15 years a distinct form of "precision aerobatics"—as different from stunting as oil is from water—has become popular with general aviation pilots of all ages. Competitive rather than exhibitionary, it is organized into standard categories which are accessible to pilots with a wide range of abilities and means. In addition to the satisfactions to be gained from competitive success there is also an increased confidence experienced by many pilots in their new-found ability to control an aircraft in unusual attitudes or situations brought about by weather, engine failure, or other emergencies. In precision flying the man and the machine are no longer the driver and the driven, but are, ideally, united as one.

As late as 1969 there was only one major civilian competition in precision aerobatics, the National Championship. This was staged by the Aerobatic Club of America, a division of the National Aeronautic Association. Top scorers were formed into a team which represented the United States in international competition. The caliber of skill shown was very high, but participation was extremely limited. Few civilian pilots had the opportunity to acquire such skill, which required many, many hours of constant practice in a specially built or designed aircraft, with appropriate training and guidance.

Any other road to a high level of aerobatic skill was fraught with danger. Aerobatic accidents have always had one of the highest fatality risks of all flying. The average fatality rate per accident has been about *three out of every four accidents.* In overall general aviation accidents, by way of comparison, fatal accidents make up about *one*-fourth of the total. No wonder aerobatics appeared to many to be the high road to disaster.

However, the picture changed radically in 1970 with the formation of the International Aerobatic Club, as a division of the Experimental Aircraft Association. The purpose of this club, the IAC, was to foster the art of acrobatic aircraft construction, and to organize formal graduations of competitive precision flying. The promoters of this new type of sport flying reasoned that if you could shift the emphasis from death-defying stunts to precision control in a competitive environment where built-in safety conditions had to be observed, aerobatic flying could be made as safe as any other type of flying—perhaps even safer.

Aerobatics is the popular term for formally designed maneuvers not necessary to normal flight. *Acrobatic* is the term used by the Federal Aviation Administration for aircraft "intended for use without restrictions other than those shown to be necessary as a result of required flight tests." Fully acrobatic aircraft are stressed for at least 6.0 "G"s positive and 3.0 "G"s negative, and have special fuel systems which allow them to be flown inverted indefinitely. They are ordinary without restrictions except for certain limitations which may be placarded in the aircraft as the result of flight testing. (Amatrue-built aircraft competing in IAC meets must be designed with a positive load limit factor of 6 "G"s and a negative limit of 4 "G"s.) Attempting aerobatics in aircraft other than those certificated in the acrobatic category can lead to overstressing the aircraft and structural failure, or result in the onset of spins or other maneuvers which may be non-recoverable.

The aircraft used by IAC members need not necessarily be homebuilt; about half of them are commercially certificated.

To broaden the interest in precision flying skill, the International Aerobatic Club introduced a fourth category—the Intermediate—to the three pre-existing categories, which had accommodated only beginners and highly proficient aerobatic pilots. The new grouping provided a much-needed proving ground for aerobats who had gone beyond the beginning stage but were not yet ready to compete safely with the champions of the sport.

The beginning level is called **Sportsman** and is designed for aerobatic maneuvers in airplanes without inverted fuel and oil systems. This category usually attracts the widest varietey of aircraft designs: such airplanes as *Citabrias, Luscombes, Aerobats,* clipped-wing *Cubs, Stearmans,* and an assortment of homebuilts and vintage aircraft. In the *Sportsman* category there are no sustained inverted or outside maneuvers. A typical aerobatic sequence includes snap and barrel rolls, simple loops, spins, hammerhead turns, and half-Cuban eights. There is no obligation for a pilot to move higher in the aerobatic categories, if he wishes to remain and compete in the *Sportsman* category indefinitely.

The second category is **Intermediate**, which demands a considerable development and additional practice. Also, a more maneuverable airplane begins to appear in this category: mainly single and two-seat *Pitts Specials. Decathalons* begin to replace the *Citabrias;* and there are fewer vintage aircraft. The required maneuvers include slow and snap rolls on 45 degree lines, fractional vertical rolls, and multiple turn spins. There are still no outside maneuvers in the *Intermediate* category, and only very brief periods of inverted flight.

The next step up, to **Advanced**, is a large one, demanding an airplane with inverted flying capability and a pilot willing to spend a great deal of time in practice. The airplane used in the *Advanced* category must be able to perform a series of complex outside and inverted maneuvers; few *Advanced* pilots fly anything but single-seater *Pitts Specials,* mainly the 180 hp special competition version. The pilot is required to do outside loops, inverted flying, and fractional snap rolls. In the two lesser categories the minimum permissable altitude is 1,500 feet, but in the *Advanced* category it is lowered to 1,000 feet. (The rule about minimum altitudes is rigorously enforced in aerobatic competition, and a failure to abide by it at an IAC meet means an almost certain disqualification.) In addition, the *Advanced* pilot is required to compete in what is known as the "Unknown Compulsory." In the first two categories the pilots only have to compete in a "Known" and "Freestyle" series of maneuvers taken from the IAC handbook and published before the beginning of the season. *Advanced* pilots begin with a series of "Known Compulsories," in sequences of increasing length and difficulty, but then they are asked to do a number of previously

U.S. Aerobatic Team member Randall "Chipper" Melton, practicing in his Pitts **Special S-IS** for the 1978 International meet in Czechoslovakia.

National champion Leo Loudenslager in his custom-bulit **Laser 200.** Wingtip geometric devices are for sighting accuracy.

un-announced maneuvers from the more difficult section of the IAC official maneuvers handbook.

The maneuvers in the "Unknown Compulsory" are different for each contest, and they are kept secret from the pilot until 24 hours before he is scheduled to fly them. Once an IAC contest starts, no more aerial practice is allowed, and thus the pilot can only spend the evening beforehand mentally reviewing the maneuvers in the handbook.

The top level of competitive aerobatics is the **Unlimited category.** Required are Freestyle, Known, and Unknown Compulsories, plus a four minute stint of original or non-Aresti figures, and finally any controlled maneuver which can be performed in a propellor-driven aircraft, including such maneuvers as tail slides, and vertical outside snap rolls. The difficulty factor is so great at the *Unlimited* level that the regular *Pitts Special* has gradually become replaced by individually modified Pitts and other specially designed airplanes. Leo Loudenslager, for example, the American Airlines first officer who won the U.S. National Championships from 1975 to 1977, uses a *Laser 200* monoplane which he built himself and specially modified for acrobatic flying. Furthermore, the minimum altitude above ground level is reduced to 330 feet (100 meters) in this category.

An IAC contest is rigorously controlled, not only while the pilots are actually in the air doing their maneuvers and being monitored by the judges, but also before the airplanes even leave the ground. IAC's handbook of official rules outlines the safety procedures which must be followed throughout the competition. Technical inspectors from IAC examine each airplane carefully for proper condition, and anything of a questionable nature must be corrected before the airplane is allowed to fly.

The flight manual limitations of the particular airplane are also checked, to make sure that it will not be attempting a maneuver which it is prohibited. The use of radios in flight competition is not allowed, nor the use of smoke systems. Each airplane must carry enough fuel and oil aboard to takeoff, hold, fly the program, land and taxi to the parking line under power.

Individual pilot licenses are inspected. Each contestant is required to have at least a private pilot certificate and current medical certification. Any pilot who has not flown in a prior competition may be required to demonstrate his proficiency to the judges before the contest, even though he might hold an FAA low altitude waver.

According to IAC rules no alcoholic beverages are permitted at the contest site during the time of the contest, and the IAC Contest handbook has a list of 24 categories of drugs which pilots who compete in the contest are not permitted to take. Each pilot must be fully briefed, and he is required to wear an approved parachute during all flights.

Finally, if required, an airspace waiver for the contest must be obtained from the local FAA General Aviation District Office for the competition, as well as any necessary Letters of Competency for low-level flying.

There are a minimum of five judges at each IAC contest, who have received special training from IAC during a lengthy apprenticeship. Each contest has an aerobatic zone, marked off area of 3,300 by 3,300 feet. During a typical contest with an average of 40 entrants there may be 200 individual flights with a total of some 1,500 maneuvers.

Each maneuver is graded by each individual judge on a scale of 10. A grade of 10 would represent a perfect maneuver; points are deducted for any imperfections in the maneuver. For example, the score of 1 is deducted for each five degree directional deviation from the programmed direction of flight—so that, say a hammerhead done at 75 degrees instead of 90 degrees could not receive more than a 7 in the scoring. There are also certain things which will give the pilot an automatic zero, such as flying outside the acrobatic zone, or a directional deviation in excess of 45 degrees from the programmed flight path.

But perhaps the most interesting feature of an IAC contest is the system of standardized acrobatic maneuvers. In judging aerobatic maneuvers, IAC uses the Aresti Aerocryptographic System Catalog —developed in the early 1960's by the Spanish Count Jose Aresti and used widely throughout the world in modern aerobatics. The system offers a diagram of any possible maneuver which can be performed in a propeller-driven airplane.

Just as modern choreography is able to diagram dance routines on paper, the Aresti System diagrams aviation acrobatic maneuvers, indicating the starting point, the angle and direction to be used, and the end point of the maneuver. These diagrams not only indicate the proper and safe way to perform a maneuver, but they also offer a standardized system of reference against which the judges can evaluate the performance of the individual pilot.

Furthermore, the system is weighted, so that each maneuver is assigned a degree of difficulty—the "K-factor" in the Aresti System. A manuever with a K-1 factor is most simple of maneuvers, and one with a K-100 would be the most difficult of maneuvers.

For example, a simple 90 degree turn is a K-1, while an inside spin is a K-10. A *hammerhead* with an inside entry and inside recovery would be a K-20. There is a K-36 rating for a rolling 360 degrees turn with three rolls to the outside of the turn. The K-100 maneuver (which no one has ever successfully performed in competition) is a hammerhead stall turn, entered inverted, three outside snap rolls on the way up and three more on the way down.

The rating system is an adjunct to safety, in that pilots are discouraged from attempting maneuvers beyond their capability. They are obliged to learn the simplest of maneuvers before progressing to more complex aerobatics. For purposes of competition they must content themselves with maneuvers that are point-rated within their current competitive level.

Scoring is done by visual sighting. Some judges hold up a rule or triangle to help determine precise angles, but more commonly they depend upon the naked eye, backed by experience and training. A two-day "school" is held each year in various sections of the United States, attended not only by would-be judges but also by novice competition pilots and others interested in the sport. Here, on the basis of classroom performance as well as scoring of actual aerobatics flown by experts, the judges are judged by top pilots and only the upper echelon are accepted at official meets.

At present there are 50 active International Aerobatic Club chapters in the United States and Canada with about 2,500 active members. At least 20 competitive meets are held each year, culminating with an IAC championship meet to determine the outstanding pilot in each of the four categories. The members of the U.S. National Aerobatic Team are still selected from competitors in the U.S. National Championship meet, (in preparation for the biennial International Championship) which is still sponsored by the Aerobatic Club of America. However, many team members and candi-

TYPICAL ARESTI MANEUVER SYMBOLS

Maneuver

4.2.1.1.

Inverted spin
(note that the triangle is flat on top for the spin.)

"K" Difficulty-21

6.2.3.

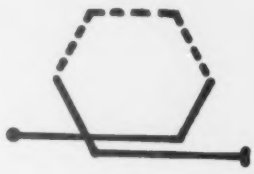
Inverted push-up to stick forward tail slide with positive recovery, changing direction 180°

"K" Difficulty-24

7.4.1.

More than 4-side loop

"K" Difficulty-18



8.5.5.

Two rolls in normal loop

"K" Difficulty-37

Legend:

- Entry point
- Termination
- Normal flight
- Inverted flight
- Knife edge (wing 90° to horizon)
- Spins
- Rolls

Source: IAC Official Contest Rules

Straight up—and over easy! Crisp, true vertical lines are the mark of a champion in precision aerobatics. Points are lost for 5° deviations.

dates are also members of the IAC, and compete frequently in IAC meets.

At the most recent International Championship meet, held in Ceske Budejovice, Czecoslovakia, from August 25 to September 6, 1978, the United States fielded a team of five pilots, all men—no women qualified. Out of 48 international competitors the Americans placed 2nd (Kermit Weeks), 7th (Bob Carmichael), 8th (Henry Haigh), 9th (Randall Melton), and 12th (Leo Loudenslager). Weeks, an investment counselor from Miami, Fla., is 24. Other ages ranged up into the mid-50s. Two of the pilots were also air carrier pilots; the others strictly general aviation. Loudenslager, three-time U.S. national champion had captured two gold and one silver medal in three of his performances at Ceske Budejovice, but dropped out as front runner in one unfortunate series when he got out of sequence in a maneuver.

What goes into the making of a championship aerobatic competitor? A great deal of pride. There is virtually no financial reward, and relatively little glory; the meets are given little notice by the press media. Expenses for traveling to the international championship, and the cost of training for five weeks beforehand are picked up by the Aerobatic Club of America, but the pilots themselves help build up the expense kitty by flying unpaid exhibitions and otherwise publicizing the team.

In addition, they must be able and willing to give up many weeks out of every year to practice. The human body must be trained to accommodate the gravity forces placed upon it without loss of consciousness (anti "G" suits are not worn). An hour of strenuous aerobatic training can leave a pilot limp and exhausted. It is a solitary kind of flying with emphasis on perfectionism that appeals to certain kinds of pilots. The reward consists chiefly of knowing that you are able to control an aircraft in flight with a precision few other pilots have ever been able to achieve.

The aircraft are small and not particularly fast or sophisticated—5% have retractable gear. The emphasis is not on speed but maneuverability, responsiveness, and control. Like hummingbirds these planes dart through the air in a manner that defies belief. Inherently unstable, they are never at rest in the air, but constantly seeking movement and change, like adventurous spirits that have been tamed.

For pilots that fly in the less strenuous categories of the IAC meets, the demands on time and patience and skill are naturally smaller. Even though competition is still the spur to maximum effort, there are really no losers in any of these categories because with each mastery of a more complex maneuver the pilot becomes more aware of what is happening to himself and the aircraft in flight, and more capable of retaining control.

IAC club officials are proud of their claim that no serious accident has ever occurred at any of their meets in the past 10 years. The International Aerobatic Club members believe that the growing interest in precision aerobatics will actually reduce the number of accidents which involve aerobatic flying—they feel that the great majority of these accidents are the results of "whimsical" stunting rather than organized competition. Having flown before the sharp eye of judges, they say the club performer is less likely to be tempted into showing off or attempting maneuvers which jeopardize safety. He knows that deliberately courting danger can cost you a meet—or a life. ■

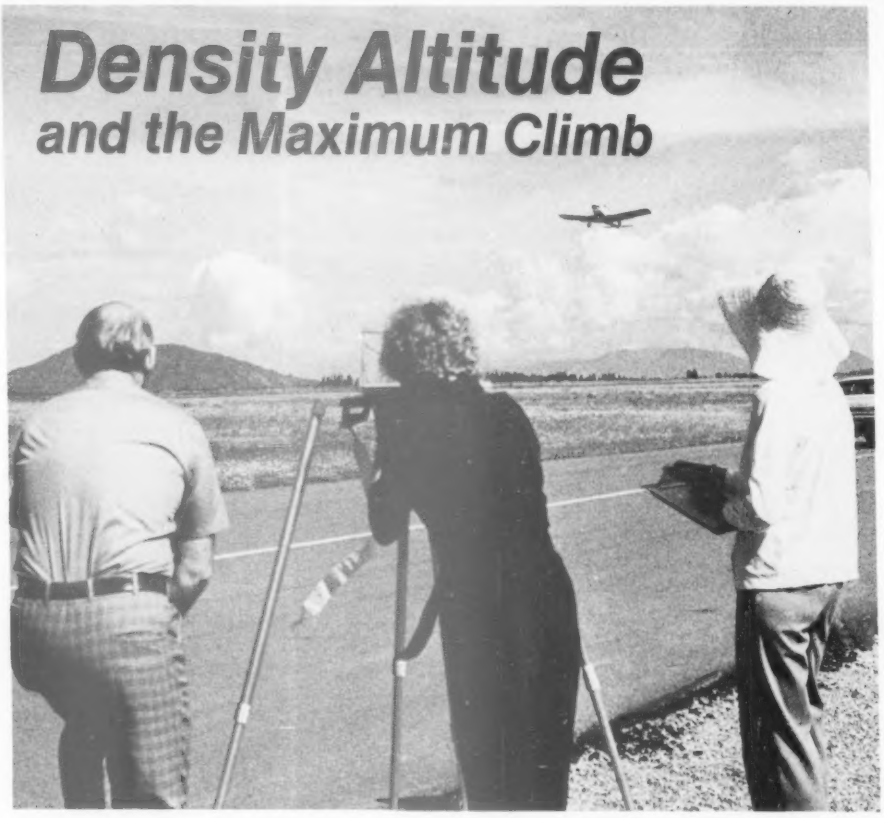
While the 1979 schedule of International Aerobatic Club meets has not yet been established, it is expected that it will follow the pattern of the 1978 schedule, which was as follows:

May 6-7	St. Louis, Mo.; Sportsman-only contest.
May 12-14	Fredericksburg, Va.; 4-category East Coast Aerobatics Championships.
May 18-21	Mojave, Calif.; 49er Gold Cup Regional Aerobatic Contest; 4-categories.
May 20-22	Centralia, Ontario; Aerobatics Canada Chapter 3 training weekend.
May 26-28	Humboldt, Tenn.; 8th Rebel Regional Contest; 4-category.
May 26-29	Boulder, Colo.; 4-category 3rd annual Rocky Mountain Aerobatics Championships.
June 2-4	Denton, Tex.; Lone Star 4-category Contest.
June 9-11	Jaffrey, N. Hamp.; 3-category contest.
June 11-12	Salem, Ill.; Sportsman-only Contest.
June 16-18	Brockville, Ontario; Aerobatics Canada Chapter 5 4-category Invitational Contest.
June 16-18	Bear Creek, Ga.; South Eastern United States Aerobatics Championships; 4-categories.
June 23-25	Orange County, New York; 4-category contest.
June 30-July 2	Centralia, Ontario; Canadian Open Championships.
July 1-3	Council Bluffs, Iowa; 5th annual Midwest Aerobatics Championships; 4-category.
July 7-9	Owosso, Mich.; 4-category Regional contest.
July 14-16	Medina, Ohio; 4-category 4th annual Western Reserve Regional Contest.
July 21-23	Ottawa, Kans.; 4-category aerobatic contest.
Aug. 7-12	Fond du Lac, Wisc.; International Aerobatic Club Championships
Aug. 25-Sept. 6	Ceske Budejovice, Czechoslovakia; 9th World Championships.
Aug. 26-27	Centralia, Ontario; Canadian National Championships.
Sept. 2-4	Calhan, Colo.; Pikes Peak Aerobatic Championships.
Oct. 10-14	15th U.S. National Championships, ...

THE ENGINE DOCTOR

Explains why the engine and the pilot can be at different altitudes at the same time

Density Altitude and the Maximum Climb



AIRCRAFT OWNER: *Doctor, I've just had a shattering experience in my airplane.*

DOCTOR: Not literally, I hope.

OWNER: *Worse! I've been humiliated, in a public place. I don't know what I'm going to do. I may never fly again. But I'll tell you one thing for certain: if ever again I hear my husband bragging about what a great pilot he's married to, he's going to have to start looking for a new flying partner.*

DOCTOR: I see. Well, that seems to be a problem out of my field. Is there anything I can help you with?

OWNER: *There sure is. You can tell me what's wrong with the engine in that airplane of mine, which you certified just last month as being A.O.K. It let me down when I needed it most. It had about as much power as a sick kitten.*

DOCTOR: Yours is the *Sundowner*, seven three Papa, right? Yes, I remember it looked pretty healthy to me. When did the problem develop?

OWNER: *When we were on the lake that night at Coeur D'Alene, up in Idaho.*

DOCTOR: You were flying over the lake at night?

OWNER: *No, we were on a boat—a moonlight cruise, that was put on for all the pilots. We'd come for the density altitude seminar that FAA was putting on, and they were going to have this takeoff contest on the next day, to see just who could come closest to getting off in the distance they predicted. There were a lot of FAA people on the boat too—from the GADO in Spokane, and from their regional headquarters in Seattle. There was even the FAA general aviation chief from Washington. We were all having a great time, cruising around the lake in the moonlight, talking and telling stories like usual. My husband got to talking with this head guy from Washington and of course he had to give him a few pointers on how to run the agency, which is all right with me, but then he had to introduce the whole family, saying how proud he is of us, because the boys each have their own plane and so do I. And that was all right. But then he got to saying that I was the best pilot of them all, when it came to flying by the numbers, and I was sure to win that takeoff contest on Saturday. He even offered to bet anyone in sight, and give them odds. There weren't any takers, but I guess they were just being polite. You beginning to get the picture?*

DOCTOR: I believe it's coming into focus. I will assume that you did not win. Where did you finish—second? Third? A bit further back?

OWNER: *All the way back. I was about 40th in a field of 40.*

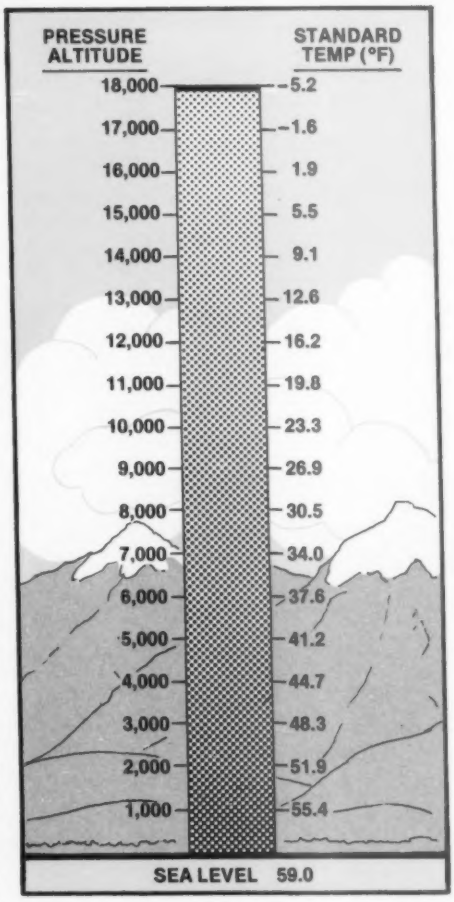
DOCTOR: That is discouraging. What were the rules of this competition

OWNER: *Well, they had this runway 19 at Coeur D'Alene Airport set up with judges alongside the field and instruments so that they could tell how much distance from start it would take you to clear a 50 foot obstacle. You got penalized for every extra foot you allowed yourself and you got disqualified if you didn't clear that imaginary barrier in the distance you predicted. They had one category for private pilots, and another for commercial/ATRs. Of course I had to go for broke.*

DOCTOR: Of course. May I assume that you made all the necessary computations correctly?

OWNER: *You bet. At standard conditions the* Sundowner *needs about 1900′ to get off over a 50′ obstacle, according to the book. Temperature was about 75°F. at noon and the field elevation was about 2,300′. On the Koch chart that added up to a 50 percent increase in takeoff distance, so I threw in a little for good measure and added 1,000′ to the 1,900′—2,900′ was the number I put down. Actually I figured I could clear the obstacle in about 2,500′, considering the way that powerplant was purring when I left home. I would have, too, if the darn engine hadn't let me down. Would you believe it, I was still straining to get airborne*

when we passed under the obstacle point?
DOCTOR: Hmmm. Anyone else have that problem?
OWNER: *Yeah, there were several other pilots I knew had a struggle, but no one overshot the mark as far as I did. According to the theodolite measurement, it took me 3,850 feet from starting roll to get up to 50′ above the runway. If those judges hadn't been mostly a group of 99's who I know are great gals, I would have been sure somebody was kidding. I was so humiliated I almost flew straight home after I got into the air.*
DOCTOR: A painful experience, I'm sure, but also a learning experience.
OWNER: *What did I learn? Seemed to me I just had a weak engine—I could feel it was* not *running smoothly during the takeoff.*
DOCTOR: Did you have any trouble with the engine once you became airborne?
OWNER: *No, not after I leaned it out.*
DOCTOR: Aha! Did you try leaning slightly before or during the takeoff?
OWNER: *Well no, the airport elevation was only 2,300′.*
DOCTOR: Ah, but what was the density altitude?
OWNER: *How should I know?*
DOCTOR: There are formulas or prepared tables for computing density altitude that you can buy from fixed-base operators. There's a good table in FAA's *Aviation Weather Services* advisory circular. If you have a flight computer you can work it out yourself, or any flight service station you can contact in a mountainous area will be glad to compute it for you. It *is* important. On the strength of the figures you mentioned. I would say that you were well over the 4,000′ density altitute level. Which means that for best performance in your aircraft it may have been necessary to lean your engine slightly for takeoff. Anything less than best performance would extend the takeoff.
OWNER: *I can't believe that would make me go 1,000 feet past the mark. No way.*
DOCTOR: Oh, I agree, that is only one of the factors. Let's look for some others. Temperature, for example, is critical. Where and when did you get your temperature reading.
OWNER: *I took it off the OAT gauge, right about noon.*
DOCTOR: I see. And how soon after that did you take off. Right away?
OWNER: *Well, no, not right away. I believe there was a little delay, we had some problem with the communications. I think I got off about one o'clock, local time.*
DOCTOR: A full hour later!
OWNER: *So what? The temperature would be peaking at noon, wouldn't it?*
DOCTOR: Not in late August, at that latitude. Remember, on daylight saving time the sun has another hour to reach its zenith. On a clear day it might peak around 2:00 p.m. or later. It so happens I attended a recent density altitude clinic like this at Wendover Airport, in western Utah, where the temperature peaked out at 95°—between five and six o'clock. One chap was nearly 2,000′ beyond his mark before he got up to 50′. The actual temperature when you took off could easily have been 80° instead of 75°F. That would make it . . . uh, 27° above standard. If you check your Koch chart I think you will find that would give you about 200′ more needed for your takeoff run.
OWNER: *How is that? Doesn't 59° from 80° equal 21°?*



Above—standard temperatures for given altitudes. Column of air indicates reduction of density. Below — 180 hp Beech Sundowner.

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DOCTOR: Standard temperature varies according to altitude. At Coeur D'Alene it is not 59°F but 53°F.

OWNER: *I don't think I will ever get that straight. It just doesn't make sense to me that the higher the temperature, the higher the density.*

DOCTOR: That is not how it works. Density altitude, first of all, is a theoretical concept —not a point in space or in the sky. It happens to be very useful. Let's see if we can simplify.

You know that at sea level, at what we call standard temperature (59°F) and pressure (29.92 in.) a block of air will always have the same density—the same number of molecules of air per cubic foot. You also know that in our atmosphere temperature declines about 3½ degrees for every 1,000′ you climb—more if the air is dry. So at 5,000′ the standard temperature on this same day would be about 41°F, and the density of the air considerably less than at sea level.

OWNER: *If the air temperature is down at higher altitudes, wouldn't density go up?*

DOCTOR: No, because gravity is also a factor here. The higher you go, the weaker the gravitational pull, the fewer molecules per cubic foot; above-standard temperatures also thin out the number of molecules per cubic foot of air. Thinner, or less dense air, makes the airplane act as though it were higher than the altimeter (or pressure) altitude. So density altitude is the altitude environment in terms of the actual number of molecules per volume of air, compared with the normal or standard number of molecules, in a given volume at a given elevation. In even simpler terms, it is the equivalent altitude your engine breathes.

OWNER: *Isn't the rest of the airplane affected?*

DOCTOR: Of course, the entire aircraft behaves in accordance with the density of the air—rather than according to the elevation. When density altitude is higher than pressure altitude, propeller thrust is reduced (so is drag, on the other hand), and there is less lift and less resistance to the air. True airspeed is much higher than indicated airspeed, but you may not be aware of this because normal indicated airspeed readings are still applicable for virtually all operations —stall speed, climb speed, approach, etc. The giveaway is the vertical speed indicator, which reads below normal in a climb.

OWNER: *Is that why you seem to climb so slowly in the mountains in summer—it's not just your imagination, and the closeness of the canyon walls?*

DOCTOR: Precisely. And with a higher true airspeed you need more lateral room for maneuvering, especially in canyons, and at airports with runways of marginal length. Overshooting is always possible. If you try to avoid this by approaching to land at a subnormal indicated airspeed, you could easily land short.

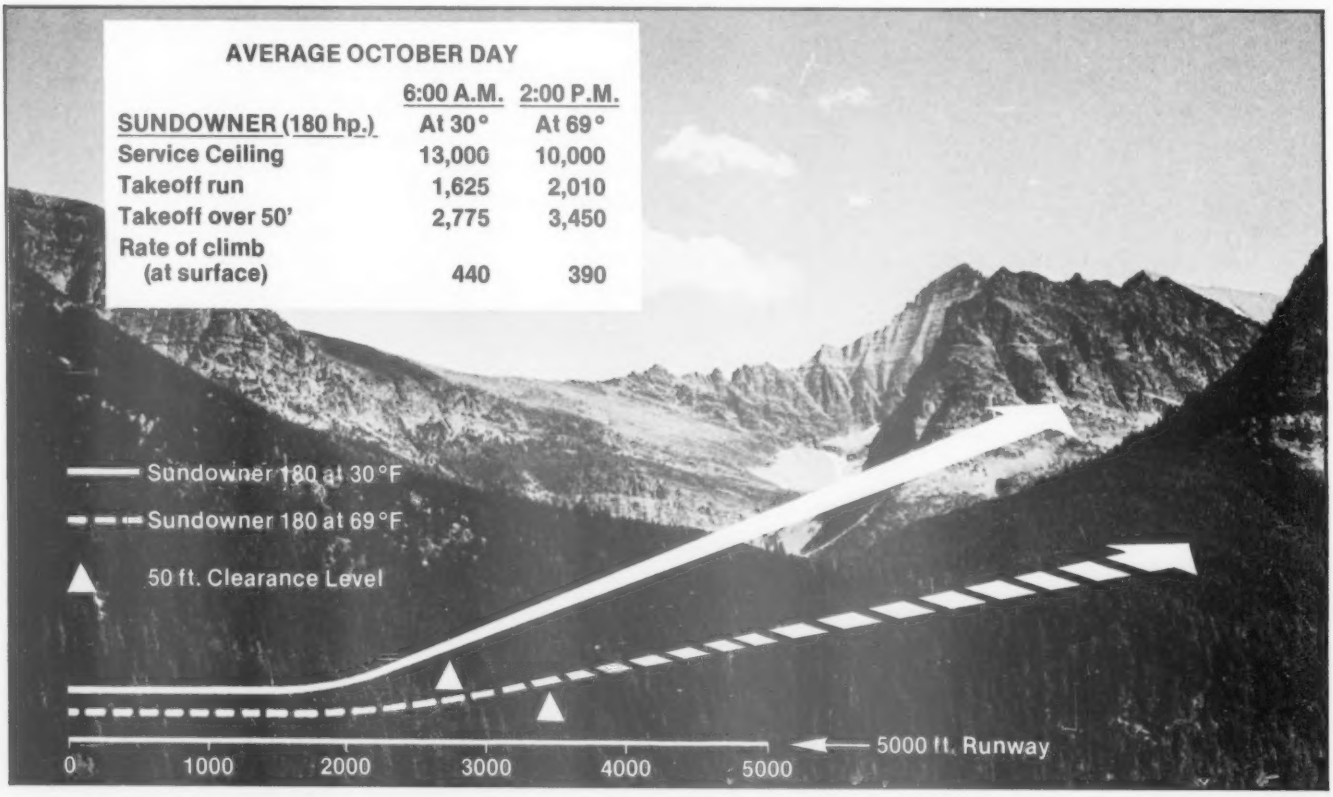
OWNER: *Sounds like they've got you, coming or going.*

DOCTOR: Not really. You simply have to make appropriate allowances for the environment your aircraft is experiencing, rather than for the altitude you read off your altimeter reading.

OWNER: *Can you ever get such a thing as negative density altitude—say in winter?*

DOCTOR: Certainly. And not just winter, but at night or whenever the temperature falls below standard. It is computed in terms of a theoretical point below sea level. Normally it presents no problem to flying and we are not even aware of it, except perhaps in terms of increased engine performance. There is a possibility, with a controllable propeller, of overspeeding the engine, but it is slight. On the other hand, I recall one occasion in Fairbanks, Alaska, where I was attempting to take off in a 172 in the dead of winter. The density altitude was computed by the tower as just about 3,000′ **below** sea level. Do you know, I was simply unable to get a rich enough mixture into the carburetor to get off the ground? But that's rare.

OWNER: *You know at Coeur d'Alene, I was way under max gross weight, which is what most of these performance computa-*



At high elevation airports like Durango, Colo. (6,684′) timing can be critical: an airplane might be able to make a successful departure early in the morning, but not later in the day. Diagram showing density altitude affect is based on manufacturer's performance figures for a new aircraft, flown by a professional pilot. Actual performance of your aircraft with you at the controls could be far inferior—**as much as 50% less.**

Horse Heaven, a 2,400' dirt strip in the Bitterroot Mountains of northern Idaho. With 3,035' elevation and surrounded by woods and hills, this beautifully situated but isolated airfield can trap the unwary airman who does not accurately calculate the effects of density altitude.

tions are based on, so that should have given me a big edge, shouldn't it?

DOCTOR: It helps, but unless you know exactly how much difference it makes in your airplane—it varies a great deal from one to another—you don't want to bank too heavily on it. Let's look at some other factors. How about the wind?

OWNER: *Negligible—three to five knots.*

DOCTOR: Straight down the runway?

OWNER: *No, we were taking off on 19, and the wind was off from the west somewhere—we didn't pay any attention to it because it was so light.*

DOCTOR: Just the same, in a critical condition even a very light wind off the beam, or abaft the beam, could affect your takeoff and climb performance if you are used to a headwind. How about the slope?

OWNER: *Slope? There wasn't any runway slope—at least that I heard about.*

DOCTOR: Did you ask anyone? Many airports have runways with a small degree of slope which is not mentioned in any of the official publications because no safety factor is involved. But when you are trying to be precise on your takeoff—or when the surrounding terrain actually does make the operation critical—even a slight uphill slant to the runway will extend your takeoff. By and large, takeoffs in hill country or from mountain airports are made downhill by knowledgeable pilots, regardless of the wind. You don't ever want to try to outclimb the terrain on takeoff.

OWNER: *Not in that crate of mine.*

DOCTOR: Come, come, let's not blame the equipment, unless we're sure our own hands are clean. It's a good airplane or you wouldn't own it. Let's look a little further. What about the climbout profile?

OWNER: *Strictly by the numbers.*

DOCTOR: Very good. Do you remember the airspeed when you lifted off?

OWNER: *Negative, but I took off just like always—trimmed her up and let her fly herself off. I never horse it up.*

DOCTOR: Well, that's fine, under many circumstances. But if the problem is to get off and up over a given terrain obstacle, in the shortest possible distance—which often happens in mountain flying—you want to hold the aircraft on the ground until you reach best angle-of-climb speed, and then lift off firmly and smoothly, holding that speed. Now, what about the climbout—what was your airspeed?

OWNER: *Strictly by the book. Ten degrees of flaps and 82 knots, for best rate of climb.*

DOCTOR: Best *rate?* Oh, dear. Oh, dear.

OWNER: *What's the matter?*

DOCTOR: I'm afraid that's where you blew it. I wonder how many unfortunate pilots have racked up airplanes in the mountains because they confused best *rate* of climb with best climb *angle*. It seems that the tighter the bind the poor chap gets into, as concerns surrounding terrain, the more likely he is to go to excess airspeed in an effort to outclimb the landscape. There is some fateful notion that safety lies in greater airspeed, but actually every knot you add on over the best angle-of-climb speed reduces your chances of getting over the obstacle. I realize the terms may be less than indicative, but somehow you must get it straight that best rate of climb means best vertical rise within a given **time,** whereas best angle of climb (with a slower airspeed) means best rate of climb within a given lateral **distance.** When it comes to clearing an obstacle, distance is the all-important factor, not time. It doesn't matter if it takes you an hour to get over a ridge, as long as you clear it safely. If you get in a hurry about it, you may run out of room in a hurry.

OWNER: *I guess you're right. I got so impatient finally I took the flaps off—*

DOCTOR: Another no-no. That cost you altitude. Your plane's best angle of climb configuration calls for 35 degrees of flaps, and there is no way of getting around it.

OWNER: *Okay. What else did I do wrong?*

DOCTOR: Nothing, I suspect. All those things we mentioned may seem of little consequence taken piecemeal, but when you put them together they could add up to quite a bundle—perhaps enough to spell the difference between survival and disaster in a real-life situation. I suggest you set up a practice course at your own airport and see how close you can come to flying the airplane according to its specified performance ability. I'm sure you would soon see a vast improvement.

OWNER: *I'm not so sure. I'm a slow learner.*

DOCTOR: Perhaps they should have given you the same consolation prize they gave the chap down at Wendover who finished last. At the Awards Banquet they presented him with a seedling tree which he was to plant beyond the runway of his choice. The idea being that in 50 years the tree would grow to a height of about 50 feet, and by that time, with regular practice, he would be able to fly over it safely. It was quite funny, really.

OWNER: *Goodbye, Doctor.*

DOCTOR: Please don't go away angry. It was all in fun. As a matter of fact, I suspect that he—and you—were the real winners of these competitions.

OWNER: *How do you figure that?*

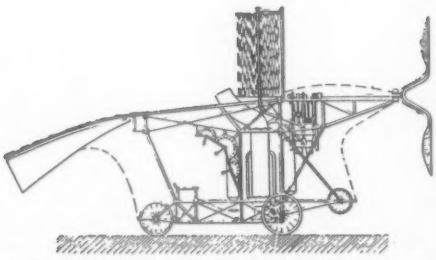
DOCTOR: Well, I don't think the objective was really to determine the pilot who could handle altitude and obstacle clearance problems best, do you? The FAA people probably knew that already. Wasn't the point to learn something about one's flying techniques in a way that shook you up without actually exposing you to any danger? And who was more shaken than you?

OWNER: *No one, you bet. Goodbye again.*

DOCTOR: Keep smiling. Next please.

(This is the third in a series of articles on mountain flying. The first two articles, in August and September, discussed California Mountains and the Rockies).

Famous
FLYERS



Clement Ader

Clement Ader
and the steam driven aircraft of the 90's

In 1871 a 40-year old Frenchman dressed in a native burnous stationed himself at the outskirts of Sidi M'sid, in Algeria, during a solemn festival for soldiers slain in battle. The European was not interested in the festival but in the movements of the vultures, who were dissauded from preying on the dead by being flung scraps of meat which they swooped down to catch in their beaks. The observer was an inventor, Clement Ader, who was probing the secrets of nature in search of a successful aircraft design. And in 1890—some 13 years before the Wright brothers first flight of 120 feet at Kitty Hawk—Clement Ader reported a sucessful flight in a steam-powered airplane he had built himself and flown for a distance of 164 feet from takeoff. Later acclaimed by French aviation enthusiasts, supported in research by the French Government and awarded the Legion of Honor, Ader nevertheless slipped into obscurity as an aviation pioneer when advancing age and declining finances put an end to his experiments. The question of whether he actually "flew" in an airplane for the first time in recorded history became lost in official verbiage from which it probably will never be retrieved.

Ader was born April 2, 1841, in Muret in the south of France near Toulouse. In his youth he became interested in aerial navigation and produced a kite that could lift a man. He studied electrical engineering and held a position in the Department of Public Works for 15 years. He resigned in 1876 to experiment with various inventions.

By 1880 he had designed the first telephone network in Paris and organized the "Industrial Society of Telephone." That same year he became interested in heavier-than-air navigation and in 1882 began construction of his first airplane, the *Eole*.

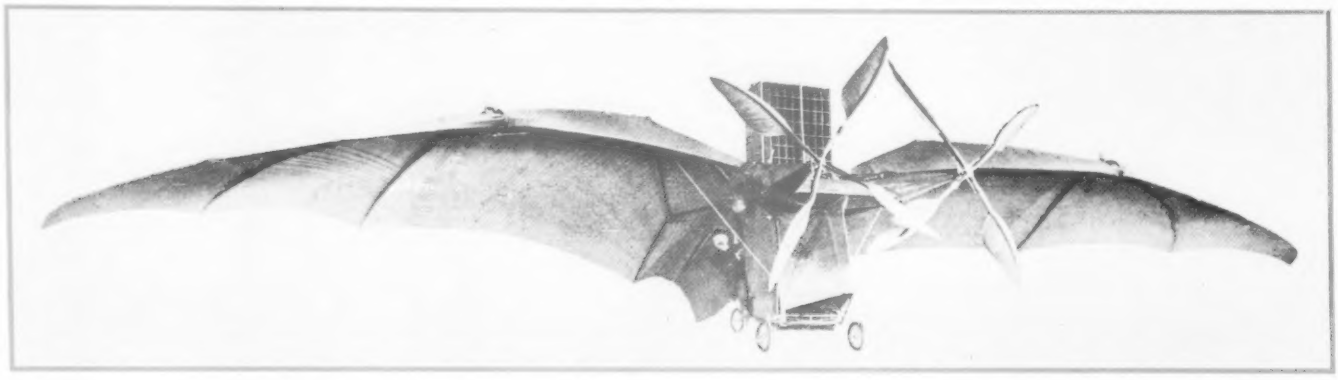
Ten years earlier, in 1872, he had been experimenting with a goose-feathered, bird-like ornithopter apparatus with a 26-foot wing spread and weighing 53 pounds. The ornithopter, of course, did not fly. After further study of birds and bats, while living for months in Algeria, Ader settled on his first fixed-wing design.

A brief description of the *Eole* shows a keen appreciation of the new science of aeronautics. Powered by a 20 hp steam engine developed by Ader himself, the plane's wingspread was 46 feet and its length a little over 21 feet. A four-bladed tractor propeller with bamboo blades was mounted in the front. The pilot sat behind the boiler in an enclosed cockpit with visibility only through two side windows. A three-wheel undercarriage supported the plane on the ground.

Ader reported, "*The 9th of October 1890, over a distance of about 50 meters (164 feet) the Eole left the ground for the first time by the sole means of its motive power. This minor event was not officially recorded, but our foreman buried in the ground lumps of coal at the exact spot where we took off in our apparatus.*"

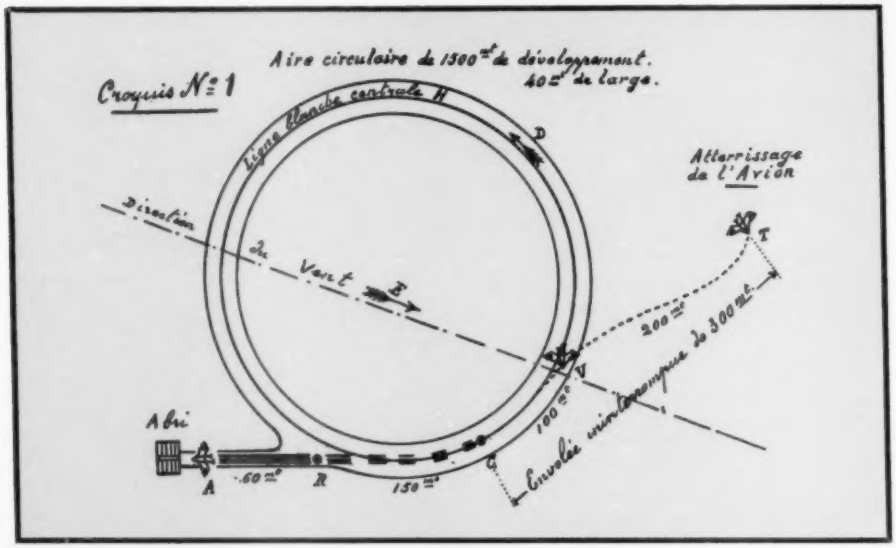
Although his altitude apparently was barely one foot, he did "pass through the air by the use of wings" without external

Looking somewhat like an oversized baby carriage with bat wings, **L'Avion** flew in 1897.



CONSERVATOIRE NATIONAL DES ARTS ET MÉTIERS
292, Rue Saint-Martin, PARIS
o 139 Salle 10 13560 - Avion Ader
CONSERVATOIRE NATIONAL DES ARTS & MÉTIERS, 292, rue St-Martin, Paris
13560 — Avion n° 3 d'Ader, 1893-1897. Poids 256 kil., comprenant 2 moteurs à vapeur de 20 HP chacun et un générateur à vapeur avec condenseur. Donné par l'inventeur en 1903. — B-10 bis

Above—Side views of Ader's **L'Avion**, as displayed in the French Museum of Art and Trade. Below—Diagram of the course for the fateful trial flight in 1897. Inventor claimed a continuous flight of 300 meters from point C to where the crash occurred.



aid, becoming airborne as a result of an unassisted take-off—and that is one definition of "flying." (Opponents of his claims were later to point out that it was an "uncontrolled ascent"—as he had no flight controls, not even a rudder.)

This early flight, as well as one the next year with a 30 hp engine, were witnessed only by gardeners and foremen on the grounds of the chateau at Armainvilliers, southeast of Paris. Flights were made over a straight-away, half-mile course, reportedly several times over distances of 100 meters (328 feet). In its last flight unbalanced propeller torque caused the airplane to crash into some carts and it was damaged beyond repair.

In spite of this setback, Ader reported his original accomplishment to the French Academy of Sciences and the Ministry of War. He was commissioned by the ministry to build an improved machine for possible national defense and for this purpose he received a grant from the French government in excess of 650,000 francs.

His second aircraft was called *Avion II*—avion is a word coined by Ader which became generally used in France to denote aircraft. Dissatisfied with early results, Ader soon began the construction of *Avion* III, for which a new contract was obtained. The aircraft was completed in the fall of 1897.

Avion III was a twin-engine, tractor monoplane, powered by two 20 hp steam engines fed by a single boiler. The engines drove two four-bladed propellers over nine feet in diameter, counter-rotating to eliminate torque. The wings had a total area of over 600 square feet, and folded back for storage. Ader's lengthy study of birds was reflected in the birdlike shaping of the wings, which curved geometrically from front to rear.

The only method of controlling the plane's pitch or yaw was by shifting or moving the wing surfaces, by means of six unwieldy cranks, each requiring 25/30 turns for any appreciable effect. Turn control was also theoretically made by changing the speed of the two engines. However, the only flights Ader made were of such short duration he had no opportunity to use any of these controls. Landing gear consisted of three wheels, two in front and one rear.

The 20 hp motors had been hollowed out as much as possible, resulting in a most efficient 2½ hp thrust per (engine) pound. The waste steam was liquified in a condenser on top of the wing, thus saving all the water by re-cycling.

Ader notified the War Minister on July 21, 1897, that his machine was finished and requested permission to proceed with trials. A group was appointed to witness the tests, consisting of experts from any fields, including General Grillon, Commandant of the Brigade of Engineers. Various tests of the engine, propellers and wing support were run before the first flight, and Ader and the committee felt satisfied.

The tests were made in great secrecy at a military camp at Satory, two miles south of Versailles. A circular track built by the Corps of Engineers was 135 feet wide and a little less than a mile long, with an entrance runway of approximately 200 feet. During a preliminary test held on October 12, 1897, Ader made a complete turn around the track, partly on the ground and partly in short elevated hops, as shown by the wheel marks. It was obvious that part of the weight of the machine had been supported by the wings, even at the slow speed it was moving. This was the first time that a comparatively heavy vehicle had been even partially lifted from the ground by propeller thrust.

Two days later, on October 14th, the first official flight test was made, in clear weather, with a strong gusty wind blowing from the south. At the start, late in the afternoon, with Ader in the cockpit, the machine ran along the runway for 200 feet, came out on the circular track, and hopped on and off the track for slightly more than 900 feet before crashing to the earth. The crash was caused by heavy gusts of wind, which tossed the plane on its side—Ader shut off the engines as soon as the plane went out of control, but too late to avoid heavy damage.

The burning question—on which the entire future of Ader's invention hinged—was, how long did he remain aloft at any given stretch? In his own report of this trial Ader mentioned that the marks of the wheels on the track were very clear ". . . *the rain having softened the ground in the morning. At Point C all marks disappeared and we saw no more of them.*" Ader also recalled noticing (during the flight) the ground "*getting farther and farther away . . .*" although most observers agreed he had not risen more than a foot above the ground.

The military observers disagreed further with Ader, reporting that his machine had left the ground briefly at intervals, and suggesting that it was just bumping along rather than actually taking to the air. In the confusion that followed the flight, when dozens of persons raced after the craft on foot, any accurate determination of flight distance from track marks probably was impossible. And the crash precluded any second attempt.

The negative report dissuaded the French Government from investing further in Ader's experienments. Honor was salvaged by installing the partially repaired *L'Avion* in a museum and by erecting a monument on the test site which proclaimed that:

"Here, on the plateau of Satory, on October 14, 1897, Clement Ader . . . in a machine conceived and constructed by him, succeeded, in spite of rain and wind, in leaving the ground and making a controlled flight of 300 meters." The sobriquet, "Father of Aviation," was added after his death in 1925. However, by this time Ader was a forgotten man.

But for an ill-timed puff of wind—who knows? ■

BRIEFS

CLASSIC ERROR OF OMISSION. Failure to remove control locks from the DC-3's rudder and right aileron was the probable cause of last December's accident which killed members of the Evansville basketball team, according to the National Transportation Safety Board report. The control locks, plus a rearward center of gravity, caused the plane to crash 90 seconds after takeoff from Evansville's Dress Airport, killing all 26 passengers and three crewmembers. It was not determined who had installed the control locks during the seven-minute stop to pick up the passengers, although the policy of the charter company called for the copilot to install the external rudder lock any time the airplane was on the ground, and also to remove it before flight. There was no company rule about the use of an external aileron lock.

IT'S THAT TIME AGAIN. If you were one of the many pilots who waited until just before the deadline in November 1974 to get your first Biennial Flight Review, check your calendar. You should be about due for your third BFR (assuming, of course, that you had the second on time in 1976.) One important note: The BFR--unlike your medical certificate--is NOT based on the calendar year (which is good until the last day of the month). The BFR is good for exactly 24 months. If you had yours on October 18, 1976, it's due on October 18 this year.

GET YOUR TICKETS NOW, for the 1978 fall season sessions of the very popular "Operation Raincheck" courses, which are mini-series in "Principles of Air Traffic Control". The 12-hour courses are designed to be helpful to all pilots who use FAA's Air Traffic Control services particularly those who have, or are working toward, instrument ratings. Courses at the Cleveland Center (Lorain, Ohio)—where nearly 400 attended last year--began October 3 and will run until all interested airmen have been enrolled. Pilots attend classes from 6:00 p.m. to 10:30 p.m. three nights (Tuesday, Wednesday and Thursday). There is no charge, but course reservations are necessary. Write "Operation Rain Check", FAA ARTCC Training, 326 E. Lorain St. Overland, Ohio 44074, or phone (216) 744-1071, X116, for tickets. Pilots in other areas who are interested in "Operation Raincheck" should contact their nearest FAA Center for information on dates and places.

TECHNOLOGY TRIUMPHS OVER THIEVES. Specialist John Giles of the Thermal, Calif Flight Service Station is used to receiving calls for help from pilots but he received one recently that was decidedly different. It started like most Mayday calls, with a voice on the radio: "Thermal radio, I have a unique problem. You're not going to believe this, but I departed Bermuda Dunes a few minutes ago and right now I'm flying over my home. I can see two guys in a white pickup truck ripping off my house!" Giles got the pilot's address and relayed it to the police. A squad car arrived at the scene in time to see the white pickup leave the house. The culprits were quickly corraled and the incident ended. (The moral of the story—addressed to thieves —is that it is not safe to rob houses that belong to pilots.)

FAR 135 Revision is "Biggest Rule Making Change Ever"

Stringent new safety rules for air taxi and commercial operators (including commuter airlines) which go into effect December 1, 1978 will provide a higher level of safety for an industry that has grown dramatically in recent years. FAA Administrator Langhorne Bond unveiled the rules change in a speech before the Aero Club of Washington, D.C. last month.

The changes completely overhauled Part 135 of the Federal Aviation Regulations, which govern most flights in general aviation aircraft where persons or property are carried "for hire". The addition of 68 new sections and significant changes to 55 existing sections will bring the operational and maintenance requirements of Part 135 operators closer to those for air carriers.

Affected are 158 commuter airlines providing regularly-scheduled passenger, cargo or mail service to 622 communities in the United States, and 4,097 air taxi operators who furnish on-demand or non-scheduled service at hundreds of airports across the country. Since 1970, passenger traffic on commuter airlines has been increasing at an annual rate of about ten percent. Last year the number of passengers increased 16.5 percent to 8.5 million, and passenger miles rose 22.8 percent to 946 million.

Requirements under the new rules are pegged to the size and complexity of the certificate-holder's operation; commuter airlines and operators using turbine-powered or large multi-engine aircraft will have to meet the stiffest requirements.

Most significant rule changes include:

- Pilots on virtually all commuter airline aircraft will be required to have an airline transport pilot (ATP) certificate. At present commercial pilot certificates are required.
- Multi-engine aircraft having 10 or more passenger seats must carry airborne thunderstorm detection equipment.
- Turbo-jet aircraft with 10 or more passenger seats must have a cockpit voice recorder and a ground proximity warning system. Also, aircraft with 19 or more passenger seats must have a public address and crew interphone system.
- Aircraft with 10 or more passenger seats will be subject to the same kind of maintenance program that now applies to air carriers. Smaller aircraft under Part 135 will have stricter maintenance standards than previously.
- Each operator will be required to establish a minimum number of supervisory positions (such as chief pilot, director of operations and/or director of maintenance), depending on size and scope of the operation.
- Flight crew training programs similar to those for air carriers are required and must be approved by FAA.

The higher level of safety provided by the new rules allows FAA to raise the size of aircraft that can be operated under Part 135 from 12,500 pounds or less (which was the old limit) to a new maximum of up to 30 passenger seats, or 7,500 pounds of payload.

Although the revised Part 135 goes into effect December 1, 1978, additional time is allowed for certain of the requirements (until June 1, 1979 for airline transport pilot certificates, and until December 1, 1979 for cockpit recorders, ground proximity warning systems and thunderstorm detection.

The regulation revisions, which Administrator Bond called the "largest and most comprehensive rule making project ever undertaken by FAA," are an outgrowth of a two-year Part 135 Regulatory Review Program in which operators played an active part. After the notice of proposed rule making was issued in August 1977 more than 1,600 public comments were received and evaluated by FAA before the rule was developed in its final form.

Proposals Withdrawn by FAA

Several Notices and Advance Notices of Proposed Rule Making have recently been withdrawn by FAA. Among those affecting general aviation were a 1974 proposal that would have taken the certification of home-built aircraft out of the experimental classification and put it under a new custom-built (amateur-built) classification, with stiffer maintenance requirements.

Also withdrawn was the July 1977 Advance Notice of Proposed Rule Making that would have established standards for Air Ambulance operations. After a careful analysis of the more than 250 comments—most in opposition—FAA has decided the economic cost of levying the proposed regulations on an entire industry outweighs the public benefits.

Other withdrawn Notices include those pertaining to clarifying the status of FAA pilots and applicants during flight tests required for certification of an aircraft; airborne vibration monitors for certain jumbo jet air carriers; and inflight overboard leakage of freezable fluids from large aircraft.

Bomb Sniffing Gerbils Tested

Can gerbils and other rodents be used to thwart aircraft hijackers and terrorists who claim to be carrying bombs? FAA has launched a two-year study to see if the little animals can be trained to detect the odor of explosives and push a button or respond in some other way if they find it.

Like dogs, rodents have a highly developed sense of smell, but they are easier to train than dogs, do not cost as much and are cheaper to feed. Do not, however, expect to see an airport policeman walking through the terminal building with a gerbil on a leash, as he would a bomb-sniffing dog. The gerbils will be kept in a stationary location, and baggage will be taken to them.

Flying Political Candidates

A special rule has been issued by FAA to permit private aircraft owners and others who are not commercial operators to accept payment (on a limited basis) for transporting candidates for elected Federal offices. FAA's action, effective as of September 26, 1978, was prompted by the Federal Election Commission requirement that all candidates for Federal office pay for their air transportation, which conflicts with FAA rules that generally prohibit acceptance of payments by operators who do not have air taxi/commercial certificates.

Although the rule change will also be incorporated into the new Revision of FAR Part 135, the latter will not become effective until December 1. The special rule puts the change into effect in time for the upcoming November Congressional election campaign.

(NOTE: Individuals who wish to fly candidates under the above terms should check with their GADO for exact provisions of the special rule.)

• Sierra Crossing

Until I read your August article "No Flight Plan to Death Valley", I had been looking forward to a trip across the Sierras sometime in a light plane. You mention Tioga Pass as an alternative to Kearsarge. However, it appears to me that if I would fly out the 023° radial of Friant VOR along V230 I could quite easily cross the ridge just northwest of the Mammoth Lakes Ski area without being much more than 9,000 feet for five minutes or so. It seemed I might be able to cross there in even an old Champ at the right time of the year.

Since you do not mention that route in your article I have become plumb apprehensive about it. Please tell me what there is about it that I can't detect on the map.

Bob Crowley
Dickinson, N. Dak.

While the route you mention is a shorter and slightly lower way to cross the Sierras than Tioga Pass, we did not suggest its use for one simple reason: there is no road or physically recognizable pass. Also note that the minimum en route altitude authorized for IFR aircraft along that segment is 14,300 feet MSL. That altitude is calculated to provide a 2,000 foot clearance over immediately surrounding terrain and is a good rule of thumb figure for VFR pilots also. The San Joaquin River, which lies in the valley below the airway for part of the route, has literally dozens of tributaries and forks to confuse the pilot who is trying to pick his way between mountain peaks.

Tioga Pass, on the other hand, follows a well-traveled highway. After researching hundreds of mountain flying accidents we are convinced that small aircraft traversing mountainous terrain should be flown over highways if at all possible. Not only does this simplify navigation and minimize chances of getting lost, it also raises the odds of finding an emergency landing site and greatly improves the chances of getting help quickly in event of a mishap. For reinforcement of this theory, read the letter below.

• From One Who Has Been There

I read your August 1978 issue on "Mountain Flying" with great interest. Having been involved in one of the six accidents near Kearsarge Pass, I can avidly endorse the advice given in the article. Although we hadn't "lost trail" and knew where we were, we found that sink can occur very rapidly. At the junction of Kings Canyon and Bubbs Creek we lost altitude so rapidly that we were not able to complete a 180 and were forced to continue up the canyon toward Center Basin where we were able to make a forced landing.

The aircraft was a total loss and I sustained serious back and foot injuries. My instructor (I was on a Mountain Flying Training Course) was relatively uninjured and able to walk out to get help for me. I have reviewed that flight more times than I care to count and have reached many of the same conclusions discussed in the article. Some points I would emphasize: (1) Maintain sufficient altitude AT ALL TIMES. We were at least 1,000 feet above the ridge when we got into trouble, and the weather was clear, with very light winds. (2) The importance of survival equipment cannot be over-emphasized. Our kit was minimal (food, water, first aid and light) and had it not been for some nearby campers who supplied a sleeping bag and some warm clothing, I don't believe I would have survived the night.

I congratulate you on an excellent article and an excellent magazine. Having broken at least one rule on mountain flying and survived, I can only hope that those that read this and similar articles take the advice to heart and stay out of the trouble zones—and stay alive.

Newell E. Raxter
Goleta, Cal.

• No Weather on Weekends?

I was pleased to note that TV aviation weather will be available beginning sometime this fall, but on weekdays only. While I applaud this presentation, I also note that the television networks do a fairly good job with their weather maps on the morning news shows. On the other hand, virtually no one presents this information on Saturday, Sunday, and holidays, when many of us do most of our pleasure flying. I hope that at some point this program can be extended to those days.

Max S. Norris, M.D.
Indianapolis, Indiana

The reason for the weekdays-only schedule of the daily early-morning televised "AM Weather" series (scheduled to begin October 30) is that Public Television does not generally operate during the early hours on Saturdays and Sundays. (Weekend information will be given on Thursday and Friday.) We will, however, pass your letter on to the producers of the program (Maryland Center of Public Broadcasting, Owings Mill, Md. 21117). For future reference, these are the people to whom readers should write if they care to comment on the production and content of TV weather programs. Comments on local scheduling—or lack of it—should be directed to the Public Broadcast Television station in your local area.

• Looking for a Location

While reading the FAA General Aviation News July 1978 issue I came across a photograph that surprised me, on page 6. I have no doubt this picture was taken either at Budaors or Kecskemet, in Hungary. Can you tell me if my assumption is correct?

Paul F. Vandor
New York, N.Y.

The aircraft pictured bears a Hungarian registration but we have no information on where the photograph was taken. Can any of our readers identify the airport?

• High Point on the Runway

In your July 1978 Forum Instrument Corner you discussed the proper procedures for setting your altimeter to the reported altimeter setting or field elevation. One important fact was not mentioned: the published field elevation is the *highest point on the usable runways*. This number could vary significantly from where you are parked when setting the altimeter.

Fred Bahr
Dublin, Calif.

An excellent point, especially for pilots who base at airports with wide elevation variations from one point on the field to another.

FAA GENERAL AVIATION NEWS welcomes comments from our readers. No anonymous letters will be used, but names will be withheld on request. Address: FAA GENERAL AVIATION NEWS, AFS-807, Washington, D.C. 20591.

• EGT Guidelines

I knew it could be done! At last, a very simple, concise, and understandable explanation of "What Cylinder Head Exhaust Gas Temperatures Mean to the Pilot." Most authors just do not seem to understand that the vast majority of general aviation pilots are not and will never be aircraft mechanics. I can now say that for the first time I do understand the procedures, and I have cut out the EGT Guidelines and placed them in the airplane with me for permanent reference and use. Thanks, Pappy.

Charles D. Bowling
Fort Collins, Colorado

INSTRUMENT CORNER

• Uncontrolled Airport Approach

I have a question concerning an IFR flight plan to an airport that does not have an operating tower or FSS. It is my understanding that if I state that I can descend to the MVA (minimum vectoring altitude) and land, in VFR conditions, I may be cleared for a visual approach. My question: when cleared for the visual approach, is my IFR flight plan automatically cancelled? If I'm flying into a small airport late at night and the weather is good, I prefer the visual approach to save time and fuel, but I do *not* want to cancel my flight plan until I am safely on the ground. Is the only solution to shoot a full approach and cancel on the ground? Or must I file a VFR flight plan for the remainder of the flight?

John W. Dennis
Tallahassee, Fla.

The handling of your IFR flight plan by air traffic control (ATC) is the same whether you make a visual approach or a full instrument approach. In neither case is your flight plan automatically cancelled when you are cleared for the approach. It is up to you to decide whether you want to cancel your IFR flight plan from the air while you are still in radio contact with ATC, or whether you would rather call them by phone after you are on the ground. If you choose the latter, please do not forget, *or you may trigger a search.*

The same is true when you have filed an IFR flight plan at an uncontrolled airport and have a time-limited IFR clearance ("void if not off by . . .") A recent rule change (FAR 91.83d) requires that if you change your mind about making the flight you must notify ATC. Otherwise they will keep your slot reserved until they can determine that your have not crashed or had radio failure after takeoff. Contrary to some belief, such IFR clearances are not automatically discarded if you do not check in by the appointed time.

NOTE: Many uncontrolled airports now have discrete frequencies for communicating with the controlling ATC facility from the ground to close IFR flight plans, receive IFR clearances, etc.

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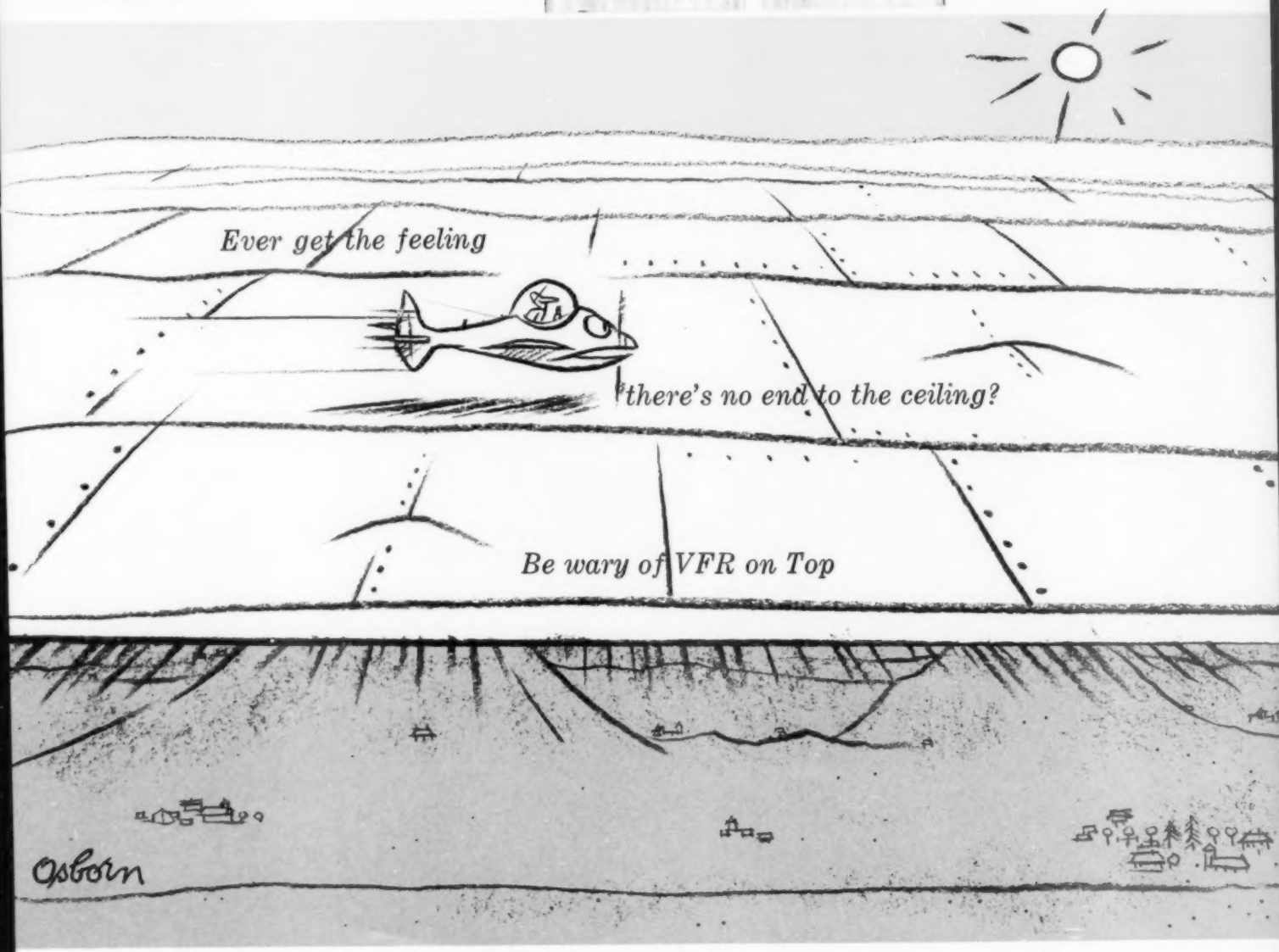
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